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# Sustainable Storm Water Management

*Environment, Energy and Sustainability  
Symposium & Exhibition  
Denver, CO*

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Office of Deputy Under Secretary of  
Defense (Installations and Environment)  
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# Outline

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- Conventional Storm Water Control
- Sustainable Storm Water Management
  - Low Impact Development
  - Leadership in Energy and Environmental Design
  - Section 438 of Energy Independence & Security Act
  - EO 13514 “Leadership for Environmental, Energy, and Economic Performance
- National Rulemaking
- DoD Storm Water Management Policy



# Controlling Storm Water

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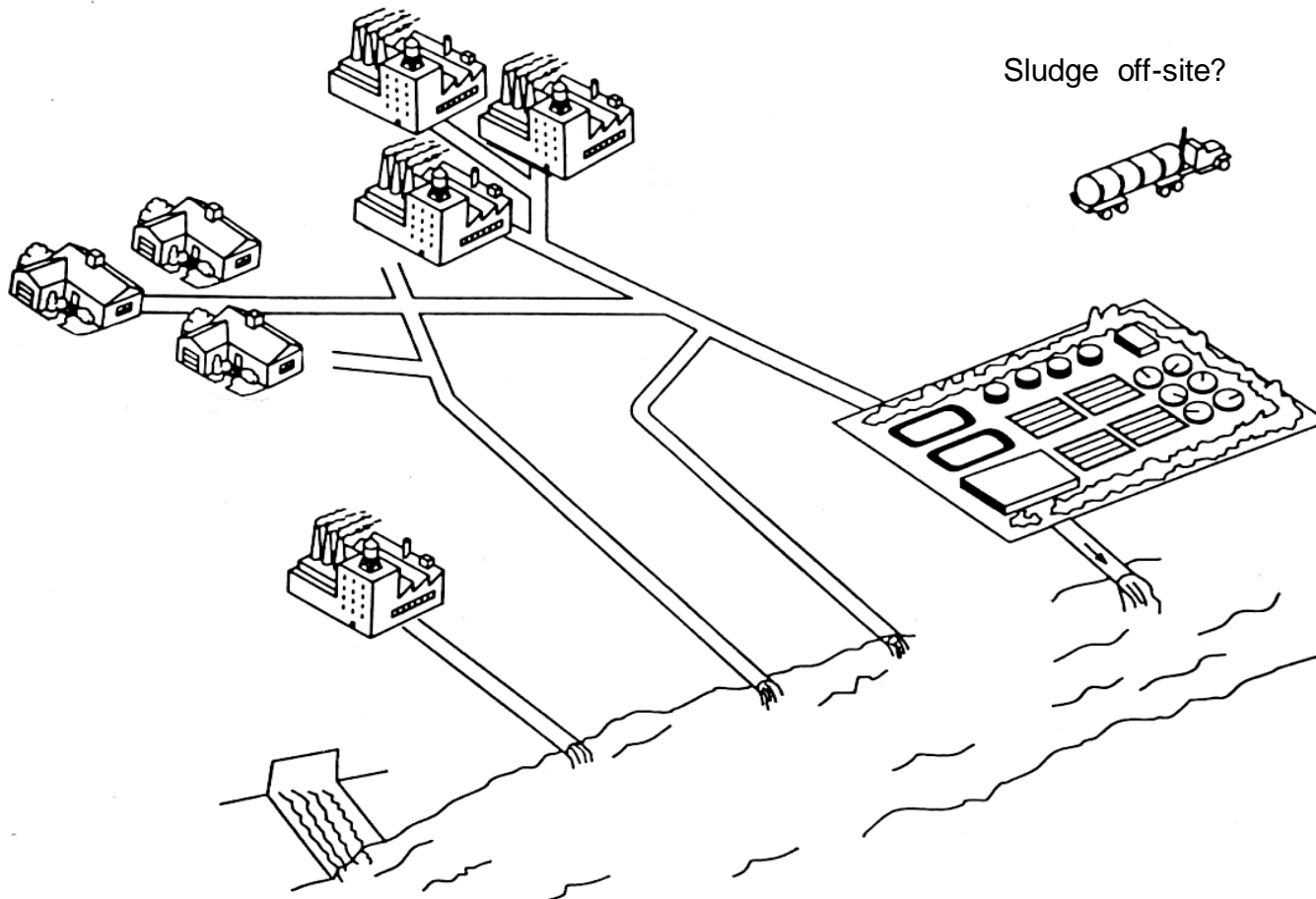
- Past approach off-site, out of sight (i.e. sludge)
  - Conveyance through use of curb and gutter, culverts, pipes, canals, and ditches
  - Detention ponds to reduce peak flows





# Where does it go?

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# Conventional Storm Water Issues

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- Large capital costs
- Large space requirements needed
- Often includes “end of pipe” management structure with maintenance costs
- Hydraulics cause stream and habitat degradation
- Increased imperviousness and flooding
- Reduced recharge to groundwater



# Sustainable Storm Water Management

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- Maintaining the natural hydrology of sites
- Promote movement of water throughout a watershed
- Water as a valued resource
- Reduce pollutants from entering waterways
- Protect natural landscape and aquatic habitat



# Low Impact Development (LID)

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- Minimizes the impact of development by mimicking pre-development hydrology runoff
- Uses site planning and management practices to store, infiltrate, evaporate, and detain runoff
- Benefits
  - Reduces flooding by reducing runoff volume
  - Improves water quality
  - Reduces impact on wildlife and aquatic habitat
  - Recharges groundwater supply
  - Cost-effect





# LID Method

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- Assess the natural hydrologic conditions through some type of analysis
- Develop site plan to reduce land disturbance and impervious areas
- Design to manage storm water with best management practices that harvest, infiltrate, or evapotransporate where possible
- Sources for LID management techniques
  - [http://cfpub.epa.gov/npdes/home.cfm?program\\_id=298](http://cfpub.epa.gov/npdes/home.cfm?program_id=298)
  - [www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org)
  - [www.lid-stormwater.net](http://www.lid-stormwater.net)



# Leadership in Energy and Environmental Design (LEED)

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- *Internationally recognized green building certification system*
- *Developed by US Green Building Council*  
([www.usgbc.org](http://www.usgbc.org))
- *Promotes whole building sustainability approach through energy savings, water efficiency, materials management, and air emissions*
- *LEED 2009 New Construction and Major Renovation Guide*



# LEED Credits

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- *Storm Water Sustainable Site Credits*

- *Storm water quantity control (Credit 6.1) - Limit disruption of natural water hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from storm water runoff, and eliminating contaminants.*
- *Storm water quality control (Credit 6.2) - Limit disruption and pollution of natural water flows by managing storm water runoff*
- *Protect or Restore Habitat (Credit 5.1) -To conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.*

- *Other credits for related to water and energy efficiency*



# EISA Section 438

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- **Energy Independence and Security Act (December 2007)**

Title IV - Energy Savings in Federal Buildings and Industry

Section 438 - Storm Water Runoff Requirements for Federal Development Projects

- **Requirement –**

The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible (METF), the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.



# Why EISA 438?

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- Storm water in urban areas a leading source of water pollution
- Increased imperviousness leads to flooding, stream channel erosion, and increased pollutant loadings
- EISA places other requirements on sustainable buildings management efforts
- Starting point with federal facilities



# EO 13514

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- “Federal Leadership for Environmental, Energy, and Economic Performance” (October 2009)
  - Increase energy efficiency, reduce greenhouse gases, conserve water resources, reduce waste, use sustainable products, and promote high performance sustainable buildings
- Storm water provision
  - EPA to issue technical guidance on EISA 438 (Dec 2009)
  - Implement EISA 438
- DoD’s Strategic Sustainability Performance Plan (June 2010)
  - Vision of practices to sustain our mission into the future
  - Established goals and metrics to track annually (EISA 438)



# National Storm Water Rulemaking

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- EPA has started the rulemaking process (Oct 2009)
- Goal propose a rule in late 2011, and finalize in late 2012 (<http://cfpub.epa.gov/npdes/stormwater/rulemaking.cfm> )
- Options:
  - Performance standards for post construction mimicking the natural hydrologic site condition
  - Expanding the universe of regulated storm water discharges to new development
  - Requirements for existing discharges (i.e. retrofits)
  - Special provision for Chesapeake Bay storm water discharges



# DoD Storm Water Management

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- DUSD(I&E) issued policy on implementing storm water requirements under EISA Section 438 on January 19, 2010
- Builds on DoD's Unified Facilities Criteria for LID, EPA's Technical Guidance on EISA 438, and EO 13514
- Defines predevelopment hydrology and METF limitations, sets design objectives, and establishes some implementing requirements





# DoD SW Management

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- Maintain predevelopment hydrology defined as pre-project hydrologic conditions for temperature, rate, volume, and duration of storm water flow
- METF limits for site conditions & regulatory requirements
- No-net Increase in storm water runoff
- Redevelopment projects consider restoring natural hydrological site conditions to extent practical
- Determine predevelopment hydrology using site specific factors such as soil type, ground cover, and slope.
- Consider availability of off-site options



# DoD SW Management

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- Implement immediately as practical
- Document separately project costs in DD Form 1391 for EISA 438/LID requirements
- Conduct post construction analysis to validate project storm water features
- Count on reporting as required by EO 13508 and EO 13514
- Unified Facilities Criteria update due June/July 2010



# Questions?